MonsoonRF Shines a Light on RFID

One of the obstacles facing radio frequency identification deployments is the cost and time required to install an RFID infrastructure. Companies wishing to try out a system within a specific area—in order to test the ability to capture tag reads and determine what they can do with that data—must first

go through the hassle of installing RFID readers and running cables that connect those devices to reader antennas, to the Ethernet and to a power source.

The three founders of MonsoonRF have developed RFID readers that they say serve to make reader installation as easy as screwing in a light bulb—literally.

MonsoonRF's RFID-enabled light canister (shown here in a version for track-lighting systems) includes a ring-shaped directional RFID reader antenna, as well as an omni-directional antenna that extends from the canister's center for transmitting read data to a control node (receiver).

The system, known as the RFID Lantern, consists of an RFID reader built into a canister (a type of lighting fixture) for an LED light bulb. Several companies plan to use prototype

versions of the technology during pilot projects for tracking linens this spring, MonsoonRF reports, and it expects to be taking orders for delivery in small quantities later this year. Sometime in 2017, the firm hopes to also begin marketing LED bulbs with their own built-in RFID readers.

John Armstrong, MonsoonRF's CEO, says he and his company's two other cofounders (Charles Lim, the company's COO and CMO, and Carlos Morales, its CSO), launched MonsoonRF in February 2015 to provide a solution that was easier to install than existing RFID technology. The company envisioned a system that a store employee could easily install, and that could be trialed and removed without the commitment of having to run cables or drilling recesses in ceilings. Not only would the readers be easy to install, he says, but they would also be invisible.

As users of Impinj products and partners of several member companies of the RAIN RFID Alliance, Armstrong, Lim and Morales opted to name their company in keeping with the precipitation theme. Monsoons, Armstrong explains, are downpours that tend to prove beneficial by soaking a drought-stricken area.

The RFID Lantern employs an RFID transceiver with an Impinj R2000 reader chip and two built-in antennas (one for receiving RFID transmissions from tags and another for sending data back to the server), embedded in a canister that can be mounted on a ceiling by either screwing it into a light socket or attaching it to a track-lighting strip. An LED bulb is then installed into the canister's lamp socket.

The canister, which is typically 11 centimeters in diameter and 14 centimeters in length (4.3 inches by 5.5 inches)—the size depends on the spotlight requirements—includes a directional RFID reader antenna that rings the canister's exterior. It also comes with an omni-directional antenna that extends from the canister's center, for transmitting data to a

control node (receiver).

The system is designed so that the reader's antennas would capture ultrahigh-frequency (UHF) RFID tag transmissions in the same area where the light is pointed. If a tag is located in the zone illuminated by the bulb, it also falls within range of the reader (which typically reads beyond the lighted area as well, though it is focused in the same direction as the light). The reader captures the ID numbers of any tags within a distance of about 20 feet, then forwards those IDs to the control node (which has direct access to the server) via a UHF signal with a proprietary air-interface protocol. The range of transmission from the reader to the receiver can be up to 1 kilometer (0.6 mile). Therefore, only one such control node would usually be necessary in a typical installation. The reader could also employ a ZigBee protocol to forward its data from one reader to the next and, ultimately, to the control node, if the size of the coverage area required it. Alternatively, Armstrong says, the reader could send data to a server via a Wi-Fi connection, if users want.

MonsoonRF's CEO, John Armstrong

The device utilizes the same AC power used for the LED light, whether the LED is turned on or off.

"You point the light at what you want to read and you'll read it," Armstrong states. A customer could install multiple MonsoonRF readers and use them to capture the tag IDs of all tagged items as they move around the store or some other

space. A retailer could thus know the location of its inventory in real time. In the event that an item were moved, that information could be captured, and software could alert the store if something was misplaced or removed without authorization (such as being taken out of the store unpurchased), or if goods needed to be replenished based on their absence in the store.

Because the readers are part of a site's lighting system, Armstrong notes, they are not visible. This, he says, provides a more discreet RFID deployment.

The company currently is seeking partners, such as systems integrators and solution providers, that would offer the technology to their customers. In the meantime, it is in discussions with potential end users regarding pilots. For instance, several companies are preparing to pilot the technology for tracking linens used in the hospitality or health-care market. By installing the readers throughout an area, in existing lighting sockets, these firms can track where each piece of linen is located and, thus, its status (such as cleaned or being repaired). One business that may resell the RFID Lantern if it is sold in high volume is a solutions distributor called BlueStar Inc.

MonsoonRF has developed the technology to be relatively inexpensive, according to Armstrong. While the RFID Lantern readers might initially cost a few hundred dollars apiece, solution providers could offer them for less than that as part of a service contract (similarly to how a wireless phone service provider sells phones at a lower price than what the device might cost as part of a contract). Pricing will vary according to the volume at which the readers are ordered.

Armstrong says his company will be ready to take orders for the canister-based readers sometime in the spring, and will be able to ship them during the third quarter of 2016. The lamp-

embedded version, he notes, is more likely to be available early next year.

Charles Lim, MonsoonRF's COO/CMO

The advantage of the RFID-enabled bulb, versus the canister, will be the simplicity of use. Some Halo recessed light fixtures, however, cannot accommodate the canisters, so in those cases, users would require an added module (offered by MonsoonRF) to make the canister fit.

The company is also writing a proposal to GS1 for an EPC Gen 2 protocol modification or extension that would allow known tags to be directly addressed by its reader. With the existing EPC Gen 2 protocol (EPC Gen2V2), Lim explains, tags that have already been interrogated compete with unread tags during the "select" read process, which slows down the effort to capture all tag reads. However, he adds, the company has developed an additional node that permits the reader to call a specific tag, without any other tags responding, thereby eliminating collision and permitting rapid confirmation of a store's inventory, for example. The firm has named its anticollision read method TagLock. If GS1 releases a new protocol, Armstrong says—such as a Gen 3 version of the UHF technology that could accomplish the same kind of reading process employed by MonsoonRF's TagLock method—that additional node would not be necessary.

MonsoonRF will be exhibiting the technology at its booth (#543) at RFID Journal LIVE! in Orlando, Fla., on May 3-5.

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